4. DESIGN BASIS

The design of the Group 6 removal action is based upon general ROD assumptions, assumptions specific to Group 6, design assumptions, and the ARARs that are regulatory drivers. The following sections discuss these factors.

4.1 Status of Record of Decision Assumptions

General assumptions that are relative to all WAG 3 groups are presented in *Remedial Design/Remedial Action Scope of Work for Waste Area Group 3, Operable Unit 3-13* (DOE-ID 2000b). These assumptions include the following:

- The requirement to begin continuous onsite substantial physical remediation within 15 months of ROD signature is planned to be met by initiation of field activities for construction of the Tank Farm Interim Action – Phase I.

- Monitoring for each group will be performed as part of the RD/RA and is separate from institutional controls.

- Remediation schedules will be based on the work breakdown structure for each group and available funding. Scheduling of remediation for the groups will meet the statutory requirements for continuous substantial physical onsite remediation within 15 months of ROD signature.

- A minimum institutional control period to the year 2095 for land use or access restrictions required to be protective will be implemented at all sites where contaminant concentrations exceeding allowable risk ranges are left in place. The continued need for land use or access restrictions will be evaluated by the Agencies during each 5-year review.

- Institutional controls prior to 2095 will consist of site access controls, radiological posting controls, and land use controls as shown in Table 11-1 of the ROD.

- Completion of the ICDF and approval to begin operations will occur prior to the start of Group 3 soil removal actions at OU 3-13.

- Contaminated soils excavated from OU 3-13 sites and other INEEL CERCLA wastes will be placed in the ICDF if they meet waste acceptance criteria (WAC) that will be identified in the ICDF RA work plan.

- Groundwater contamination in the Snake River Plain Aquifer (SRPA) within the INTEC fence line will be addressed under OU 3-14.

- Contaminated media, not previously identified by the OU 3-13 comprehensive RI/FS, may be discovered within the boundaries identified for the seven groups and "No Further Action" sites, and procedures to address these potential discoveries will be added to the respective RD/RA work plans or otherwise managed under the FFA/CO.

- To the extent possible, Resource Conservation and Recovery Act (RCRA) and decontamination and decommissioning (D&D) closures of other INTEC facilities will be coordinated with RD/RA activities to minimize duplication of effort.

4.2 Summary of Record of Decision Assumptions Specific to Group 6, Buried Gas Cylinders

Assumptions that are relative to Group 6, Buried Gas Cylinders, are presented in *Remedial Design/Remedial Action Scope of Work for Waste Area Group 3, Operable Unit 3-13* (DOE-ID 2000b). The discussion below includes these assumptions plus their current status. The assumption include the following:

Assumption #1

A safety evaluation will be performed and subsequently approved by DOE to determine if the cylinders at sites CPP-84 and CPP-94 can be removed and the contents properly treated and disposed without posing an unacceptable risk to workers. This evaluation will be presented in an engineering design file (EDF) prior to the start of the remedial design for this group.

Status of Assumption #1

An engineering design file (DOE-ID 2000c) and a hazard classification (DOE-ID 2000d) were completed to better define the distribution of cylinders at each site and evaluate the potential hazards to workers. The results of these studies defined the areas impacted by cylinder burial, identified the contents of the cylinders at CPP-94, and determined the hazard classification for the two sites. In addition, cylinders at CPP-94 have already been successfully removed from the site. The only field activities required at CPP-94 are post-removal soil sampling, and site grading.

Assumption #2

If it is determined that removal of the cylinders poses an unacceptable risk to workers, the sites will be capped in place with an engineered barrier pursuant to the substantive requirements of IDAPA 16.01.05.008 (40 CFR 264.310).

Status of Assumption #2

Based on the results from the engineering design file (DOE-ID 2000c) and the hazard classification (DOE-ID 2000d), it was determined that removal of the cylinders does not pose an unacceptable risk to workers. Therefore, an engineered barrier will not be required. In addition, cylinders at CPP-94 have already been successfully removed from the site. The only field activities required at CPP-94 are post-removal soil sampling and site grading.

The removal of cylinders at CPP-84 will be conducted by personnel with a high level of expertise in compressed gas cylinder remediation. If a situation is identified during the removal action that may pose an increased risk to workers, these personnel will evaluate the condition. An unacceptable risk would be a situation where a cylinder is identified containing a gas that is either highly explosive or toxic and that is in such poor condition that attempting to remove the cylinder would likely cause a release that is immanently dangerous to the workers. Such a condition is not anticipated based on the available evidence.

Assumption #3

If any of the soils or cylinders are determined to contain restricted listed or characteristic hazardous waste residues, the soils/debris will be treated to meet land disposal restrictions (LDRs) and subsequently disposed either on-Site at the ICDF or off-Site.

Status of Assumption #3

Soil contamination is not likely at either CPP-84 or CPP-94. However, contaminant screening (radiological and chemical) along with visual observations will assess the presence of contamination during the removal process. Post-removal soil sampling will verify that contaminants were either removed or not present at these sites in levels greater than the risk-based concentration for the COPCs identified in Table 3-2. The results of this sampling will be used to identify the final disposition of contaminated soil that is in excess of the risk-based COPC levels, thus requiring removal. The cylinders and residues of hazardous waste in empty containers will be managed in accordance with the ARARs as identified in Table 4-1.

Anecdotal evidence suggests that cylinders at CPP-84 contain construction gases. Most of these gases (oxygen, nitrogen, compressed air, argon, helium, and carbon dioxide) are unregulated and can be vented to the atmosphere. Acetylene is an ignitable characteristic hazardous waste and would carry a D001 waste code. However, LDRs do not apply since placement of the waste will not occur. If wastes are identified during the excavation of CPP-84 other than the expected construction cylinders, they will be managed and characterized in accordance with the *Waste Management Plan*. Treatment, if required, may take place at the INEEL if the waste is amenable to on-Site treatment or will be sent to an off-Site (off the INEEL) TSDF.

Assumption #4

Disposal (if required) of the empty gas cylinders will be in the ICDF.

Status of Assumption #4

The cylinders that contain the gases that are vented to the atmosphere (oxygen, nitrogen, compressed air, argon, helium, and carbon dioxide) will be rendered useless and disposed at the INEEL Landfill Complex. If the cylinders do not meet the INEEL Landfill Complex's WAC, then they will be stored for disposal in the ICDF. Acetylene cylinders are constructed with a porous filler (usually asbestos) and a solvent (acetone) to provide for safe operations. Due to environmental and waste management concerns regarding these substances, the acetylene cylinder bodies will be transported to an off-Site disposal facility.

Assumption #5

If any cylinders require off-Site treatment, off-Site disposal is anticipated.

Status of Assumption #5

If off-Site treatment is required, then the cylinder that contained those gases will be disposed off-Site. A good example of this is the cylinder recovered from CPP-94 that contained HF. This cylinder is currently stored in an off-Site storage facility awaiting off-Site treatment and disposal.

4.3 Summary of Detailed Justification of Design Assumptions

The specific design assumptions and the corresponding justification provide a basis for the removal action. These assumptions are as follows:

1. Forty to one hundred cylinders are buried at CPP-84.

   Only anecdotal evidence is available to support the number of cylinders buried at the site. However, numerous interviews with the equipment operators that dug the trench and buried

the cylinders indicate the number of cylinders that were buried. These operators also indicated that the cylinders could have been empty, partial empty, unused, or possibly damaged. Flooding exposed these cylinders in 1957-58 and the same operators covered them again. One of these operators later located the cylinders using a metal detector and staked their location. Metal detectors were used again in 1994 to locate the cylinders.

2. The footprint of the burial grounds measures 85 ft by 25 ft, with a maximum depth of 4 ft.

   Results of magnetic field surveys were reported in the Engineering Design File – *Summary of FY-2000 Characterization Activities at OU 3-13 CPP-84 and CPP-94 (Buried Gas Cylinders)* (DOE-ID 2000c). Based on field surveys the dimensions of the burial trench are approximately 25 ft by 85 ft and the cylinders are estimated to be 2 to 3 (± 1 ft) ft below ground surface. This information was confirmed by field surveys.

3. Only acetylene, compressed air, argon, oxygen, carbon dioxide, helium and nitrogen are present at CPP-84.

   A review of the chemical index sheets from the 660 Cylinder Dock indicate that construction gases were buried at the site, including acetylene, compressed air, argon, carbon dioxide, helium, nitrogen, and oxygen. Anecdotal evidence from the equipment operators suggest that construction gases from Igloo 683 were buried in the trench after the construction of INTEC was complete in 1952.

4. All cylinders from CPP-84 can be vented or oxidized.

   A review of the chemical index sheets from the 660 Cylinder Dock indicate that construction gases were buried at the site, including acetylene, compressed air, argon, carbon dioxide, helium, nitrogen, and oxygen. Anecdotal evidence from the equipment operators suggest that construction gases from Igloo 683 were buried in the trench after the construction of INTEC was complete in 1952. The venting and/or thermal oxidation (flaring) of these gases do not result in releases to the environment above any reportable quantity or regulatory limit. Any potential short-term exposure risks to workers are mitigated through the implementation of the health and safety plan.

5. No radioactive components are present.

   Radiological surveys have been completed at the surface at both CPP-84 and CPP-94. No radiological levels above background have been detected.

4.4 Detailed Evaluation of How ARARs Will Be Met

The ARARs for selected remedies for the buried gas cylinders in the ROD are action-specific, chemical-specific, and location-specific. Table 4-1 summarizes the techniques for compliance with these ARARs. Table 4-1 is a reprint of Table 12-6 of the ROD with the exception of the "Comments" column. The "Comments" column has been substantially modified from the ROD to meet the specific needs of this *Work Plan*. These changes do not imply that the ROD has been modified; they are only applicable to the context of this *Work Plan*.

Table 4-1. Group 6, Buried Gas Cylinders, ARARs.

Alternative/ARARs citation	Description	Applicable, or Relevant and Appropriate (R&A), or TBC	
Group 6—Buried Gas Cylinders: Alternative 2—Removal, Treatment, and Disposal			
Action-specific			
IDAPA 16.01.01.650, 16.01.01.651	Idaho fugitive dust emissions	Applicable	Dust suppr necessary c
IDAPA 16.01.01.585, 16.01.01.586	Rules for control of air pollution in Idaho	Applicable	Will be me Cylinder cc if they are r Toxic gase neutralizati
40 CFR 122.26	Storm water discharges during construction	Applicable	The require met.
IDAPA 16.01.05.008 (40 CFR 264.114)	Disposal or decontamination of equipment, structures, and soils	Applicable	Decontami necessary t or equipme project-spe
40 CFR 300.440	Procedures for Planning and Implementing Offsite Response Actions	Applicable	All off-Site be evaluate Site rule pr
IDAPA 16.01.05.005 (40 CFR 261.20 through 24)	Hazardous waste characteristics identification	Applicable	No contam excess of th 3-2. Waste evaluated f specified in
IDAPA 16.01.05.005 [40 CFR 261.7(a)(1), (b)(2)]	Residues of hazardous waste in empty containers	Applicable	All residua will be con determined managemer

Table 4-1. (continued).

Alternative/ARARs citation	Description	Applicable, or Relevant and Appropriate (R&A), or TBC	
IDAPA 16.01.05.008 (40 CFR 264.170 through 179)	Use and Management of Containers	Applicable	Substantiv hazardous contamina considered and manag project-spe
IDAPA 16.01.05.011 (40 CFR 268)	Land disposal restrictions	Applicable	No hazard D001 for a acetylene s occur. Ho managed i waste man generated.
IDAPA 16.01.05.011 (40 CFR 268.49)	Alternative LDR treatment standards for contaminated soil	Applicable	Classificat excavation However, accordanc manageme
IDAPA 16.01.05.008 (40 CFR 264.553)	Temporary units	Applicable	Areas desi temporaril acetylene considered
IDAPA 16.01.05.008 (40 CFR 264.554)	Remediation waste staging piles	Applicable	The use of anticipated
IDAPA 16.01.05.008 (40 CFR 264 Subpart X)	Miscellaneous units	Applicable	The use of is not antic
IDAPA 16.01.05.008 (40 CFR 264 Subpart J)	Tank systems	Applicable	The use of anticipated
IDAPA 16.01.05.008 (40 CFR 264 Subpart BB)	Air emission standards for equipment leaks	Applicable	No air emi anticipated accordanc Prevention

Table 4-1. (continued).

Alternative/ARARs citation	Description	Applicable, or Relevant and Appropriate (R&A), or TBC	
IDAPA 16.01.05.008 (40 CFR 264 Subpart CC)	Air emission standards for tanks, surface impoundments, and containers	Applicable	No air emi impoundm All release the project plan.
IDAPA 16.01.05.008 (40 CFR 264.310)	Landfills	Applicable	Applies on cylinders o above risk-
Chemical-Specific			
IDAPA 16.01.05.005 (40 CFR 261)	Identification of Hazardous Waste	Applicable	Suspect soi identify the the RBC fc Wastes ger and manag Manageme
Location-specific			
None identified			
TBCs			
None identified			

4.5 Plans for Minimizing Environmental and Public Impacts

One of the general purposes of the FFA/CO (DOE-ID 1991) is to "expedite the cleanup process to the maximum extent practicable consistent with protection of human health and the environment." The parties to the FFA/CO intended that any response action selected, implemented, and completed under the Agreement will be protective of human health and the environment such that remediation of releases covered by the Agreement shall obviate the need for further response action.

Every effort has been made in the planning of this project to utilize well-established and available processes and guidance, and achieve compliance with CERCLA and RCRA processes. Special consideration will be given to the disposition of dangerous or emergency conditions. If a dangerous or emergency condition is discovered that may pose "imminent and substantial endangerment to people or the environment," personnel have the authority to stop work per FFA/CO Section 29. Monitoring plans and strategies to mitigate impacts to human health and the environment include the following:

- Spill prevention and emergency response planning that details how emergency situations will be responded to and controlled
- Health and safety planning that details proper operating procedures, job-hazard analyses, and personal protective equipment throughout the project
- The use of real-time air monitors to provide early detection of releases
- Physical inspection of each cylinder for integrity prior to removal from the excavation site to minimize the potential for a release.
- Project fence boundaries and signs to prevent unauthorized entry
- Storage areas and racks with protection from wind, rain; plus sun and regular inspections of these areas to identify problem cylinders
- Detailed excavation plans that call for both mechanical and hand-digging in conjunction with real-time magnetometer probing
- Use of specially designed a grappling device that minimizes exposure to workers during cylinders handling
- A post-remediation inspection will be completed to ensure cylinder removal and verify that appropriate revegetation and grading is complete.

5. REMEDIAL DESIGN

This section outlines the activities that will be performed to meet the RAOs and RGs set forth in the ROD. The activities are discussed in the following sections: Mobilization, Excavation Operations, Cylinder Segregation and Staging, Cylinder Sampling, On-Site Laboratory Analysis, Cylinder Treatment, Cylinder Disposal, and Post-Removal Sampling. Figure 5-1 provides a graphical summary of the remedial action.

The cylinders will be managed under the Compressed Gas Associated (CGA) guidelines for abandoned compressed gas cylinders. These guidelines are specifically addressed in the CGA guidance document P-22, *The Responsible Management and Disposition of Compressed Gases and Their Containers* (CGA 1995a). The cylinders meet the criteria of "Abandoned Cylinder" as defined in P-22 and should follow the guidelines for management of such cylinders.

5.1 Mobilization

All required personnel and equipment will be mobilized to the site. The construction coordinator will direct all mobilization activities. The equipment list includes the following:

- Excavation equipment (Cat 320 or equivalent track-hoe excavator with containment grade polycarbonate operator shielding and Case 580 or equivalent back-hoe with Earth Resource Corporation [ERC] Cylinder Grappler® attachment and containment grade polycarbonate operator shielding)
- Cylinder racks with protective structure
- ERC Emergency Cylinder Overpacks
- Metal detectors, shallow metal detector (White model 9400-DLMAX, or equivalent) and deep metal detector (Schonstedt Magnetic Locator Model CA-72 Cd, or equivalent)
- Real-time air monitoring equipment including photo-ionization detector, combustible gas indicator, oxygen meter, sulfur dioxide detector
- ERC Valve Sampling Station®
- ERC Cylinder Recovery Vessel®, (will be brought on-site if required)
- Mobile analytical equipment (MS and FTIR)

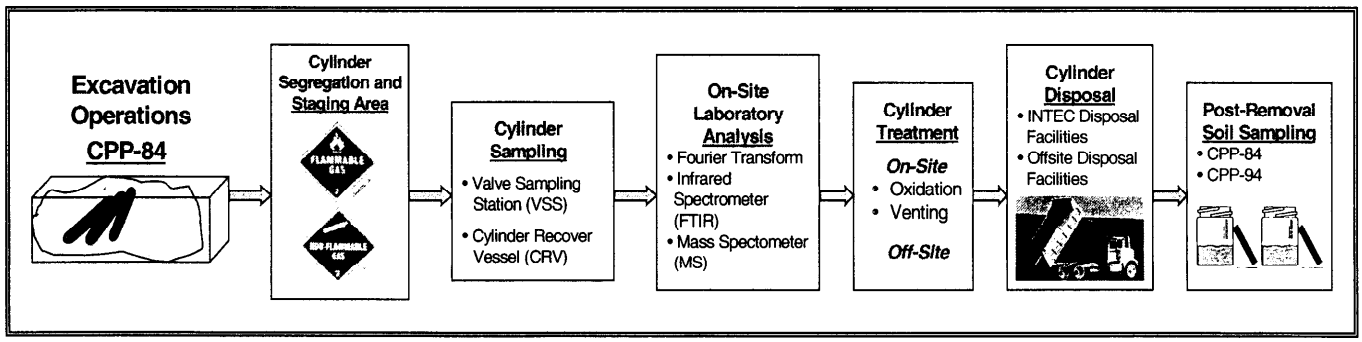

Figure 5-1. Description of remedial action.

- Communications equipment
- Cylinder handling dolly
- Personnel protection equipment
- Spill control equipment
- Miscellaneous hand and power tools
- Support vehicles
- Portable sanitary facilities.

The job site will be segregated into three work areas: EZ, contamination reduction zone (CRZ), and SZ. These zones are designed to provide site workers with safe and efficient work areas. Considerations include stockpiling of excavated soil, safe ingress and egress for equipment and personnel, sampling and laboratory operations areas, and segregated storage areas. Figure 5-2 provides a layout of the work site.

5.2 Excavation Operations

The excavation will be performed in a manner protective of worker safety and to minimize the potential for a release to the environment. Cylinders will be excavated by mechanical and hand-digging. Excavation activities will be photo-documented. During mechanical excavation, for protection against fragmentation from a catastrophic cylinder failure, workers will be protected by either containment-grade polycarbonate shielding or 1/4-in. steel plate. Mechanical excavation will be performed in 6-in. lifts and will not be performed within 6 in. of cylinders. Continuous magnetometer surveys, physical probing air monitoring, and radiological surveys will be performed to during the excavation process. Hand excavation will be performed within 6 in. of cylinders to expose the cylinders for mechanical lifting. Cylinders will be preliminarily identified visually and evaluated for stability according to CGA guidelines as expressed in pamphlets C-6 (1993), C-6.1 (1995b), C-6.3 (1999), and C-13 (2000). The cylinders must be evaluated as safe for transfer before movement to the staging site. If the cylinders are classified as unstable they will be removed from the excavation by the cylinder grappling device designed specifically for that purpose. Figure 5-3 is a photograph of the grappling device. Identification of cylinders as unsafe for transfer will result in cessation of removal activities and re-evaluation of the hazards and excavation approach. At this time, the use of robotic excavation will be considered.

5.3 Cylinder Segregation and Staging

Cylinders will be segregated by compatibility type based on the preliminary cylinder classification. Flammability will be the segregation criteria. All cylinders that are determined by the initial inspection to contain nonflammable gases (nitrogen, oxygen, compressed air, and argon) will be segregated separately. Likewise all flammable gas cylinders (acetylene) will be staged together. The segregated groups will be staged a minimum of 30 ft apart (in accordance with CGA P-22 [1995]) and will be situated away from the sampling and removal areas.

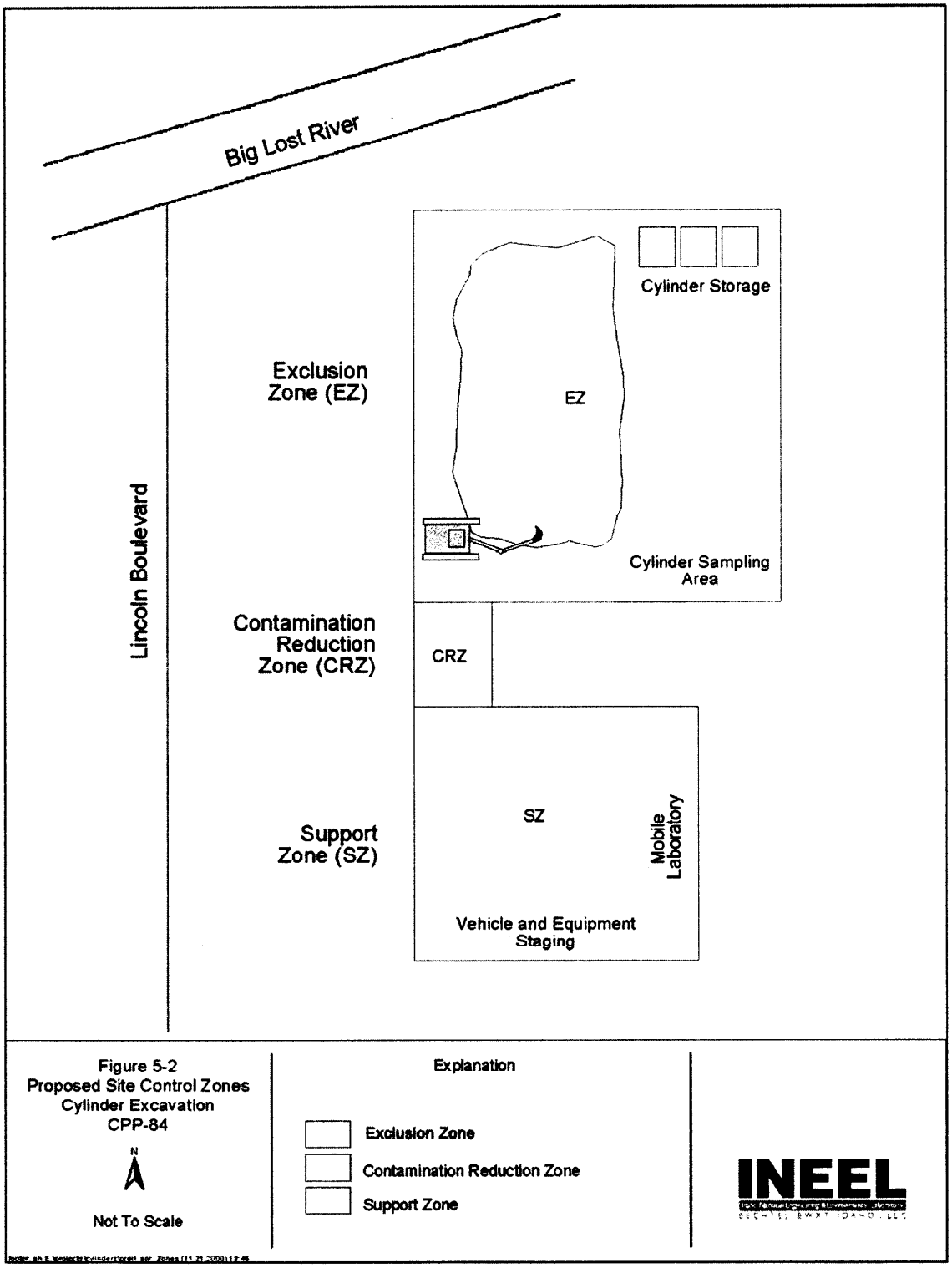

Figure 5-2. Proposed site layout.

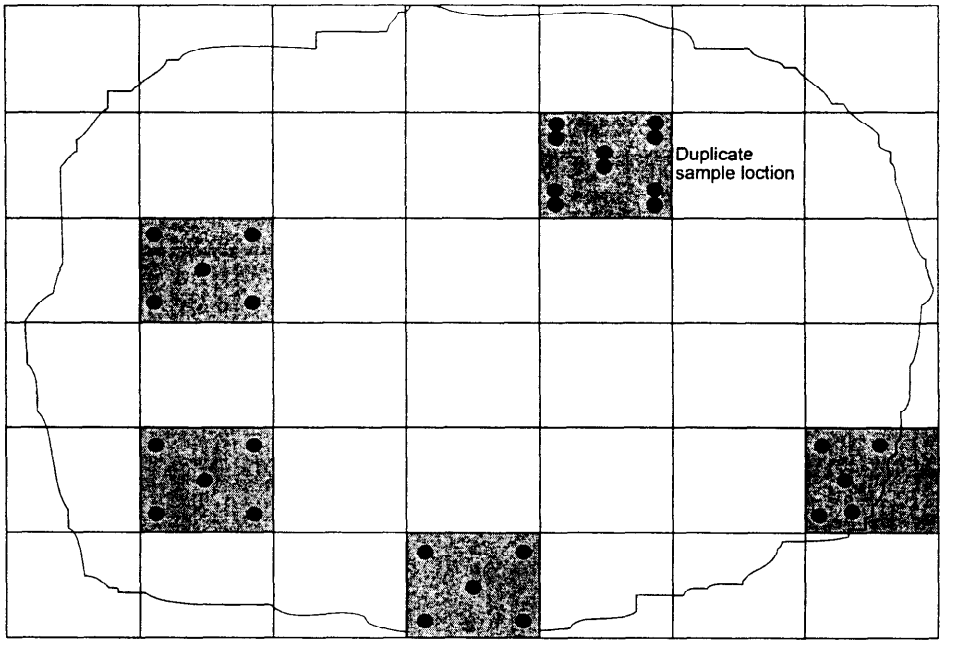

Figure 5-8. Hypothetical grid layout with composite sampling locations.